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Wealth

Crucial but Not Sufficient Evidence from Pakistan on Economic Growth, Child Labor, and Schooling

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Abstract

The relationship between wealth and child labor has been widely examined. This paper uses three rounds of time-series, cross-sectional data to examine the relationship between wealth and child labor and schooling. The paper finds that wealth is crucial in determining a child's activities, but that this factor is far from being a sufficient condition to enroll a child in school. This is particularly the case for rural girls. Nonparametric analysis shows a universal increase in school enrollment for rural girls from 1998 to 2006. This increase is independent of wealth (measured by per capita expenditure). Multinomial logit regression further shows that wealth is insignificant in determining rural girls' activity decisions. Thus, interventions to increase school enrollment should incorporate broad-targeted, demand-side interventions as well as supply-side interventions.

This paper—a product of the Economic Policy and Poverty Unit, Poverty Reduction, Economic Management, Finance and Private Sector Development Department—is part of a larger effort in the department to provide poverty assessment in Pakistan. Policy Research Working Papers are also posted on the Web at http://econ.worldbank.org. The author may be contacted at xhou@worldbank.org.

Wealth: Crucial but Not Sufficient
Evidence from Pakistan on Economic Growth, Child Labor, and Schooling[1]

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1. Introduction

In their seminal paper, Basu and Van (1998) proposed the "luxury axiom" that children only work when their families are unable to meet their basic needs. This axiom suggests a strong linkage between child labor and poverty, and has been supported by many cross-sectional studies (see, for example, Maitra and Ray(2002) and Ersado(2005), and panel data studies, such as Edmonds (2005)). However, other studies have shed doubt on this axiom by suggesting a more nonlinear relationship between poverty and child schooling/work decisions. For example, Bhalotra and Heady (2003) found a "wealth paradox"- children in land-rich households are more likely to work and less likely to attend school than children in land-poor households. Swaminathan (1998) showed that in Gujarat, India, wage employment increased among children with economic growth. Similar trends were also found in other Indian states (Kambhampati and Rajan 2006).

Pakistan presents a particularly interesting case in studying the relationship between wealth and child labor and schooling. Pakistan experienced strong economic growth from 1998 to 2006, despite a severe drought in 2001 and an earthquake in 2004. Economic growth has translated into higher household incomes and lower levels of poverty. However, the implications of economic growth during this period on child labor and schooling are less known. That said, however, if we assume that poverty is a key barrier for school enrollment, then it follows that school enrollment rates should have increased. Conversely, if we assume that economic growth induces higher demand for child labor, then the incidence of child labor should have risen.

The main objective of this paper is to examine the association between wealth and child labor and schooling in Pakistan in the context of economic growth from 1998 to 2006. Child labor and schooling, however, are only two dimensions of child activities. In Pakistan, another

major dimension of child activities is “inactiveness” (neither schooling nor working), especially among girls. Thus, another objective of this paper is to examine the association between wealth and child inactiveness. A straightforward hypothesis is that economic growth reduces inactiveness because in theory it generates more opportunities for schooling and child labor.

The paper finds that wealth is crucial in determining child activities but it is not sufficient to enroll children in school. This is especially the case for rural girls. Nonparametric analysis shows a universal increase in school enrollment for rural girls from 1998 to 2006 and this increase is rather independent of wealth (measured by per capita expenditure). Multinomial logit regression further shows that wealth is insignificant in determining rural girls’ activity decisions. Nonparametric analysis also shows that the relationship between wealth and child activities is contingent on poverty and survey rounds. Thus, conditional cash transfer or cash transfer programs alone cannot be sufficient to get children out of work and go to school. Rather, supply side interventions which focus on strengthening the education system are also crucial.

The paper makes several contributions to the literature. First, the paper uses time-series, cross-sectional data to examine the relationship between wealth and child activities rather than one round of cross-sectional data. Thus, the findings are more robust. Second, the paper explicitly considers inactiveness as one of the activities children engage in. Thus, the interpretation is more refined. Third, the paper disaggregated ‘children’ into four groupings: urban boys, urban girls, rural boys and rural girls. These categories of children are examined separately in light of the fact that school and work opportunities vary among these four groups.

The paper is organized as follows. Section 2 presents the theoretical model for child activity decisions that underpins this study. This is followed in Section 3 by a description of the data and measurement employed. Section 4 then discusses the empirical method used in this

paper. The descriptive trends and empirical results are then presented in Sections 5 and 6 respectively. Section 7 discusses. Finally, Section 8 provides a synthesis of key conclusion, along with the policy implications of our findings.

2. Theoretical Model

The theoretical model presented follows the model proposed by Edmond (2007), but with some modifications. Edmonds (2007) considers two periods of time. The household decision makers (parents) have the utility function U (V_0, V_1), where V_0 is the current living status and V_1 is the living status in the future for children (period 1). Edmonds (2007) considers four child activities: education, leisure and play, work outside the household, and work inside the household. Since the data used cannot differentiate between work outside the house and work inside the house, or leisure and domestic work, the model below presents only three specific activities: work (W), education (E), and other time spent at home (H), where other time spent at home includes both domestic work and leisure.

Despite these classifications, a child can combine different activities. For example, a child can go to school and can also work, or a child can go to school and can also perform some domestic activities. That said, however, one constraint is a lack of data on the quantity of time spent on various activities. In addition, available data also shows that a very small percentage of children actually go to school *and* work at the same time. Therefore, to simplify the model, I further restrict E=(0,1), H=(0,1) and W=(0,1). These three activities will guide the rest of theoretical model and empirical analysis in the next sections.

Parents decide a child's activities depending on the marginal utility of each activity[2]. If the child goes to school:

(E=1, H=0, W=0) <=> $MU_E \geq MU_H$ and $MU_E \geq MU_W$

if the child goes to work:

(E=0, H=0, W=1) <=> $MU_W \geq MU_E$ and $MU_W \geq MU_H$

if the child stay at home:

(E=0, H=1, W=0) <=> $MU_H \geq MU_E$ and $MU_H \geq MU_W$

Marginal utilities depend on a vector of different factors. For example, the marginal utility of education depends on the quality of schooling and parental preference for schooling vis à vis other competing activities. It also depends on education related expenditures, including both direct expenditures, as well as, costs related to transportation, meals, etc. The marginal utility gained from work depends on the presence of job opportunities for children (such as productive assets at home), child wage, or opportunity wage to hire alternative labor. The marginal utility from time spent at home depends on household demographic characteristics, household size, and other factors.

Thus, the reduced form is as follows:

$$Y(E,W,H) = F(Age, Sex, HH, EXP, A_p, C) \quad (1)$$

where HH represents household demographic information, *EXP* represents expenditure/income, A_p represents the presence of productive assets and C represents the community characteristics.

[2] The functional forms of utility function and marginal utility can be found in Appendix 1.

3. Data

This paper uses Pakistan Integrated Household Survey (PIHS) 1998/1999, PIHS2001/2002, and PIHS2005/20006[3] for data analysis. The Pakistan PIHS data include different modules such as household demographic information, household assets module, employment and schooling. The dataset also includes a detailed consumption module, which has been used to examine the relationship between wealth and child activity decisions.

This paper defines child labor as a child who is aged between 10 and 14, and employed. Although different organizations have used different age limits to define child labor, in general, the minimum age of child employment is considered to be 15 years. This is largely based on the minimum age of completion of compulsory schooling. The lower bound of 10 years is used because surveys only ask household members aged 10 years old or above about their employment activities. The definition of "work" is based on the question: "Did (the person) do any work for pay, profit or family gain during last month at least for one hour on any day?" If the household member answers "yes", he/she is considered to be employed.

Community is defined as the primary sampling units (PSU) provided in the data. Since households are randomly selected within each PSU from lower income, middle income and high income groups, the average at the community level is considered to be a good representative of prevailing conditions in the community.

4. Empirical Method

The empirical estimation is based on the reduced form of equation 1. The empirical methods applied have three notable features.

[3] A similar survey was also conducted in 2004/2005 but some critical questions in the labor module in 2004/2005 are different from the surveys used in the paper. Therefore, the study can not use PIHS2004/2005.

First, the analysis is separated into four groups: rural boys; rural girls; urban boys; and urban girls and estimate the multinomial logit model for each group in order to capture the heterogeneity among these four groups. Alternatively, these four groups can be combined into one sample, and an urban dummy and sex dummy added, along with the interaction terms between these two dummies. However, this approach assumes that other factors (such as per capita expenditure) have the same effects across the four groups. Such an assumption is not likely to be the case in Pakistan for two reasons. First, the descriptive analysis and other evidence show that there is a huge difference in child activities between boys and girls. Such difference is mostly due to cultural reasons. Second, the opportunities for child labor in urban and rural areas are very different. In particular, while children have more opportunities to be apprentices in urban areas, they are more likely to engage in agricultural activities in rural areas. Thus, four separate groups are more appropriate to address the heterogeneity among the four groups.

Second, I use lowess nonparametric method to examine the relationship between wealth and child activities. Compared with parametric fitting, nonparametric fitting is more flexible and can fit any pattern of data. It makes minimal or virtually no assumptions about the relationship between wealth and child activities, and can reveal unexpected patterns and departures from linear assumptions. However, without parameters there is no quantitative interpretation of effects or relationship and it is difficult to incorporate substantive statistical tests. Therefore, I also use some parametric method to complement the lowess nonparametric method.

Third, I use multinomial logit model to quantify and test the significance of the relationship between wealth and child activity decisions. Early econometric models on child activities were limited to binomial logit or probit specifications using either child work as 1 or child schooling as 1. However, this approach bundles inactive children either with children who

go to school or with children who work. It is especially inappropriate in Pakistan because many children are inactive, especially girls. Multinomial logit model can capture all the activities at the same time. It is also more consistent with the theoretical framework presented in previous section because of the representation of the simultaneous nature of decisions about the child time allocation (Ersado 2005). Because only a very small percentage of children both work and go to school, I consolidate this group with schooling group and use three categories (school, work, inactive) for multinomial logit analysis

The model is as follows:

$$\Pr(\text{activity}=j) = \frac{\exp(\beta_j X_i)}{\sum_{k=0}^{3} \exp(\beta_k X_i)}, \quad j = 0, 1, 2,$$

where j=0 is going to school, j=1 is working and j=2 is staying inactive.

X is a vector consisting of factors associated with child activity decisions. The most important factor is per capita expenditure since the paper primarily examines the relationship between wealth and child activities. I also include a squared term of log per capita expenditure in the multinomial logit model to capture the curvature of the relationship. The model also controls for other variables that have been documented in the literature on their importance in determining child school and work decision. These variables include child age, household head female, household head married, interaction of household head female and married, residence status of household head, household head education variables (primary school, middle school, high school, college), household employment status (employer, own-account workers, unpaid family workers, or paid employees), household size, and household demographic information (number of girls between 0-5, number of boys between 0-5, number of girls between 6-15, number of boys between 6-15, number of women between 16-55, number of men between 16-55,

number of women over 55, number of men over 55) and community characteristics, and survey fixed effect.

Community characteristics include presence of boy school, presence of girl school, school distance, median wage for men, percentage of households having piped water, percentage of household having pump water in the community. Presence of boy school or girl school in the community is true (=1) if at least one school aged child (5-14 yr) currently enrolls in school; Distance to school is defined as the percentage of enrolled children (5-14 yrs) who reported the distance to school below 5km[4]; Median wage for men is defined as the median earnings per day of men between 25 to 62 yr old; Women's earnings can not be controlled because many working women did not report any earnings; And percentage of households having piped water and pump water provide some information on basic infrastructure in the communities.

In the rural cases, productive asset variables are also included in the model. Productive assets, such as possession of agricultural lands, laden animals, farm animals, are important determinants for child labor in developing countries because the return on these productive assets can be increased relatively cheaply with child labor. This has been found in Cockburn and Dostie (2007), which argues that the demand for child labor is more household-specific given there usually lacks smoothly functioning child labor market in developing countries.

[4] It is not separated by boys and girls because many communities do not have any girl enrolled in school thus these communities do not have a non-missing value of distance to school for girls

5. Descriptive Analysis

5.1 Economic Growth

After a devastating earthquake in 2001, the economy has grown rapidly in Pakistan. This is illustrated in Figure 1 in which the distribution of per capita[5] expenditure are depicted for three rounds (1998/1999, 2001/2002, 2005/2006). Poverty has decreased. According to the World Bank, poverty headcount rate is reduced from 30.0% in 1998-1999 to 28.3% in 2004-2005 and 25% in 2005-2006(The World Bank Group 2002; the World Bank Group 2008). A wide-ranging program of economic reforms, including fiscal adjustment, banking sector reform, trade reform and privatization of energy, telecommunications, and production, launched in 2000 has played a key role in the country's economic growth. The external environment of low interest rates, abundant liquidity, and robust external demand, has also been favorable for the country's growth(the World bank Group 2008). Economic growth has brought more investment in education, especially the expansion of private sector in education provision (The World Bank Group 2008).

5.2. Child Activities

The school enrollment rate increased and child labor rate decreased for both boys and girls in both urban and rural areas from 1998 to 2006 (Table 1). In urban areas, school enrollment has increased from 72% to 78% for boys and from 70% to 75% for girls; in rural areas, school enrollment rate has increased from 61% to 67% for boys and from 35% to 47% for girls. In urban area, child working rate has decreased from 9% to 7% for boys and from 3% to

[5] Capita is adjusted with adult equivalence and expenditures are adjusted to 1998 value.

2% for girls; in rural area, child working rate has decreased from 15% to 13% for boys and from 12% to 10% for girls.

Another competing "activity" for children against schooling is being "inactive", meaning not being enrolled in school or formally in the labor force based on the definition described earlier. The rate of being "inactive" decreased from 1998/1999 to 2005/2006. In urban areas, the rate of being inactive decreased from 16% to 13% for boys and from 25% to 23% for girls; in rural areas, the rate of being inactive decreased from 20% to 16% for boys and 52% to 41% for girls.

Child labor and schooling decision varies with age and sex, which is illustrated in Figure 2. Children are less likely to go to school when age increases, for both girls and boys. Conversely, children are more likely to work when age increases, especially for boys. However, when they get older, girls are more likely to be inactive and boys are less likely to be inactive. The relationship is quite smooth without significant drop around 12 – 14 years old at which age children are supposed to transit to middle school. This is primarily because many poor children in Pakistan start school fairly late; thus they do not necessarily transit to middle school when they are 12-14 years old.

5.3. Child Labor by Employment Status

The employment status is very different between urban and rural areas for both working boys and girls. In rural areas, working children are more likely to be unpaid workers but in urban areas they are more likely to be paid workers. Table 2 shows the descriptive statistics. Take the most recent survey in 2005/2006, in rural areas about 67% of working boys are unpaid family workers and about 33% are paid workers; however, in urban areas about 78% of working boys

are paid workers and about 22% are unpaid family workers. Similar patterns are found for working girls.

These patterns suggest that the opportunities for child labor are quite different between rural and urban areas. In rural areas, children are more likely to engage in agricultural activities and become a "family helper" without getting paid; while in urban areas, children are more likely to find opportunities to get some paid work. The gender difference of employment status among child labor is also significant in Pakistan. Girls are more likely to be unpaid family workers compared to boys in both urban and rural areas.

The trend of employment status of working children shows that from 1998 to 2006 the most significant change is the increase in percentage of paid workers for urban boys. For urban boys, the percentage of paid workers has increased from 69% in 1998/1999 to 78% in 2005/2006. However, this does not necessarily imply that the demand for paid child labor has increased because the overall employment rate for urban boy decreased from 9% in 1998/1999 to 7% in 2005/2006. Interpretation of change in employment status among working girls should be of great caution because the denominator (total number of working girls) is very small.

5.4. Child Labor by Industry

The industries for child labor are quite different among urban boys, urban girls, rural boys and rural girls (Table 3). In spite of the agricultural sector, boys are more likely to work in wholesale and retail industries and girls are more likely to work in the service and manufacturing industryies. Take the most recent survey in 2005/2006, in urban area 37% of working boys are in the wholesale and retail industry, followed by 22% in the service industry and 22% in the manufacturing industry; 48% of working girls are in the service industry followed by 39% in the

manufacturing industry. In rural areas, 68% working boys are in the agricultural industry , followed by 11% in the wholesale and retail industry; 82% working girls are in the agricultural industry, followed by 11% in the manufacturing industry.

The trend shows there were some shifts between industries among different groups (Table 3). Compared with 2005/2006 with 1998/1999, more boys tend to work in the wholesale and retail industry in both urban and rural areas; while more girls tend to work in the service industry in urban areas and work in the agricultural industry in rural areas. More specifically, in rural areas, more boys shifted from the agricultural industry to wholesale and retail industry; more working girls shifted from manufacturing industry to agricultural industry. In urban areas, more boys shifted from manufacturing industry to wholesale and retail or service industries; and more girls shifted from agricultural industry to service industry.

6. Empirical Results

The section reports the empirical results focusing on the relationship between child activities and wealth using two methods. The first method is to use the non-parametric approach (lowess curve) to examine the relationship between the propensity of different child activities and wealth and the second method is to use the multi-nominal logit model to examine factors that are determining child activities, particularly wealth. The study finds that wealth is crucial in determining child activities but it is not sufficient to bring children to school. There are some other important factors determining child activities. This is especially the case for rural girls.

6. 1. Child Activities and Wealth: Non-parametric Approach

The relationship between log per capita expenditure (adjusted for 1998/1999 values) and the propensity of child activities by urban boy, rural boy, urban girl and rural girl are presented in Figure 2. The vertical line is the poverty line. Figure 2A reports the case of schooling, Figure 2B reports the case of work and Figure 2C reports the case of being inactive.

For children who are not poor (above the poverty line), the propensity of going to school given a certain wealth level (measured by log per capita expenditure) is quite similar between different years for urban boys, urban girls and rural boys (Figure 2A). For poor rural boys and urban boys, there is a general increase in school enrollment from 1998/1999 to 2005/2006. This is not the case for rural girls, for whom a universal increase in school enrollment is observed along the expenditure spectrum. The pattern suggests that there are other factors driving the increase of the school enrollment rate for rural girls.

In the case of work (Figure 2B), the propensity of child work for the non-poor is quite constant between different years and the likelihood decreases with the increase in wealth. However, the difference is more pronounced for the poor children among different years. Child labor participation rate for the poor hit the highest in 2001/2002, in which year Pakistan experienced severe droughts. This observed co-incidence suggests that more children have to work to respond to natural shocks in order to sustain households' pre-shock living standard. Child labor participation rate for the poor is the lowest in 2005/2006, suggesting that economic growth in Pakistan does not induce more demand for child labor, which is different from the findings in India (Kambhampati and Rajan 2006).

A closer examination in Figure 2B shows that the relationship between child labor and wealth is not always downward sloping. In 2005/2006, the relationship is an inverted U-shape for

rural girls and urban boys. This finding is similar to that in Bhalotra and Heady (2003), in which the authors explain the pattern by that the not-so-poor households with lands or productive assets are more likely to use their own children as child labor. This relationship will be further examined in the multinomial logit model. However, it is important to note that the relationship between wealth and child work could be contingent on different years.

Such contingency of wealth-child work relationship on years suggests the relationship is volatile. The graph shows that it is mostly driven by children who are at the lowest distribution of wealth. The likelihood to work for the extreme poor children might be highly contingent on the demand for their work both within the households and/or in the communities. There might be less opportunities for the extreme poor children to work compared with those whose households own some productive assets. Nonetheless, this pattern suggests a broader targeting to reduce child labor by not just focusing on the poorest of the poor, but also those around the poverty line.

In the case of inactiveness (Figure 2C), the relationship between wealth and propensity of child inactiveness is downward sloping for all groups and all years. However, there is an increase of inactiveness in 2005/2006 for both rural girls and urban girls who are blow the poverty line. Such increase is accompanied with the decrease in the propensity of working in the same years.

6.2 Results from Multinomial Logit Analysis

This section presents the multinomial logit results for the four groups. I will focus the discussion on the relationship of log per capita expenditures and ownership of agricultural productive assets with child activities. Before the results are presented, the limitation of this study should be acknowledged. Per capita expenditure is endogenous thus the paper can only examine the correlations between wealth and child activity decision rather than causality

between the two. Child activity decisions are presented in table 4a, table 4b and table 4c. Table 4a presents results for rural boys, table 4b presents results for rural girls and table 4c presents results for urban children. To make the interpretation easier, the coefficients are presented for continuous variables and the relative risks are presented for dummy variables.

When per capita log expenditures increases, rural boys are less likely to work but at a decreasing rate. Similar pattern is also observed for rural boys being inactive (Table 4a). This suggests that wealth does have a crucial effect on child activities. In terms of relationship between productive assets and child activities (presented in column 2), the study does not find the inverted U-relationship between agricultural land and propensity of child work, which was found somewhere else[6]. Children in households with agricultural land are less likely to be inactive and are not different in propensity of working (compared with households without any agricultural land). Thus, children in households with land are more likely to go to school. This implies that the wealth effect of land ownership is greater than the "productive asset" effect. Table 4a also shows that children in households with any farm animals or laden animals are more likely to work. Ownership of farm animals or laden animals has a positive correlation with wealth but it also makes households attempt to use child as inexpensive and convenient labors.

Other findings include: rural boys are more likely to work and less likely to be inactive when they get older; rural boys are less likely to work and be inactive when household head education level increases; rural boys are more likely to work and less likely to be inactive when household heads are own-account workers; household size and demographic structures also have significant influences on child activity decision.

[6] I also used the continuous variable of agriculture land, which is not presented in the table but available upon request.

Many community variables are significant in determining child work and schooling. Presence of girl schools and boy schools in the community reduces the likelihood of working or staying inactive for rural boys. However, the distance to school does not matter for rural boys' activity choices.

There are quite a few distinctions of the results between rural boys and rural girls, as presented in table 4b. First and most importantly, the relationship between wealth and child activities is much weaker and the coefficients are not significant at the 0.1 level after controlling for individual, household and community characteristics. This pattern suggests that the importance of wealth for girls' schooling is much weaker; other factors are more crucial in determining rural girls' activities. Second, if household heads are unpaid family workers, rural girls are more likely to work. If heads are unpaid family workers, households are more likely to have some business or productive activities within the household. Thus, girls do not have to go out to work and are more likely to be exploited as child workers at home. Third, many community variables stand out for rural girls. Presence of girl schools in the community can significantly reduce the probability of child work and inactiveness. Distance to school also matters a lot. Fourth, year fixed effects are significant for both work and inactiveness for rural girls, but not for rural boys or urban children. Compared with 1998/1999, rural girls are less likely to work or be inactive in 2005/2006. This pattern is consistent with Figure 2A and suggests that there are more institutional and other factors driving the increase of school enrollment for rural girls.

There are a few points to be noted in urban child activities (Table 4c). First, the employment status of household head is not significant in determining child labor. This suggests in urban areas child labor opportunities are more determined by the labor market rather than by

households. Second, school distance becomes insignificant, even for urban girls. This suggests that in urban areas there is less variation in presence of school or school distance.

7. Discussion

This paper uses cross-sectional, time-series data to examine economic growth, child school, and work decision in Pakistan. The relationship between wealth and the child activity decision is quite similar across different years for children above the poverty line, except for rural girls. Wealth plays an insignificant role in determining rural girls' activity decisions in the multinomial logit model. However, rural girls' school enrollment has increased significantly over the years across all the expenditure percentiles. This implies that other factors, such as presence of schools for girls, distance to school are more critical in determining girls' school enrollment. This finding echoes the findings from the Learning and Educational Achievements in Punjab Schools (LEAPS) study(The World Bank Group 2008) and other papers (Bhalotra 2007).

The fining also brings us to pay special attention to rural girls. The urban-rural difference and the gender difference in school enrollment are largely driven by low enrollment rate for rural girls. Rather than being active in the labor market, most rural girls stay "inactive" at home and may be substantively involved in domestic works. As illustrated in the paper, the relationship between wealth and rural girls' schooling and inactiveness are very weak. In Pakistan, many unmarried girls are enforced with *purdar* norms and their mobility is restricted by not being able to travel without accompany or permission from a male member of the family (Khan 2000; Sathar, ul Haque et al. 2003; Mumtaz and Salway 2005). Thus the presence of girl schools in close distance is crucial for girls to enroll in school, as found in this paper and emphasized in the most recent World Bank Pakistan Gender Report (The World Bank Group 2005). In addition,

presence of qualified female teachers who show up for work on a somewhat regular basis is critical to increase girls' enrollment (The World Bank Group 2005).

The enrollment rate has increased for rural girls in the years examined, but the increase can not attribute too much to wealth or economic growth. Instead, other institutional changes contribute more to the increase in rural girls' school enrollment. Data can not provide direct evidence on causality of institutional changes on girls' school enrollment but the fact is that dramatic changes have occurred in the educational landscape in Pakistan since 1990s. One of the most important changes is the emerging and booming market of the private schools in both urban and rural areas. The number of private schools increased from 32,000 to 47,000 from 2000 to 2005 and by the end of 2005, one in every 3 enrolled children at the primary level was studying in a private school (The World Bank Group 2008). The private schools are not just targeting on high income families but more on general population because the fees are quite affordable by the general population. A nationwide census of private schools shows that the fee in the median rural private school was about Rs.60 per month in 2000 (The World Bank Group 2008). The increase in the number of affordable schools provides more opportunities for parents to invest on children's education, especially for rural girls.

8. Policy Implications

The study suggests the demand side intervention should not just focus on the poorest of the poor, but rather have a wider targeting strategy. The reasons are as follows. First, the study finds strong negative relationship between per capita expenditure and the likelihood of child working or being inactive. It suggests that poverty is still a key factor that keeps children out of school. Second, the study also finds that ownership of productive agricultural assets and head

employment status are strong determinants for rural children to work. Since household with some productive assets are less likely to be extreme poor, this findings imply that inventions to increase children school enrollment and to reduce child labor have to broadly target the poor and pro-poor, not just on the extreme poor. Third, the study shows an inverted U-shape between log per capita expenditure and the likelihood of child work in some years for some groups, suggesting that under some circumstances households around the poverty line are more likely to send children to work. All the evidence suggests household targeting from the demand side interventions cannot just focus on the poorest of the poor but need a broader coverage for all the poor and pro-poor.

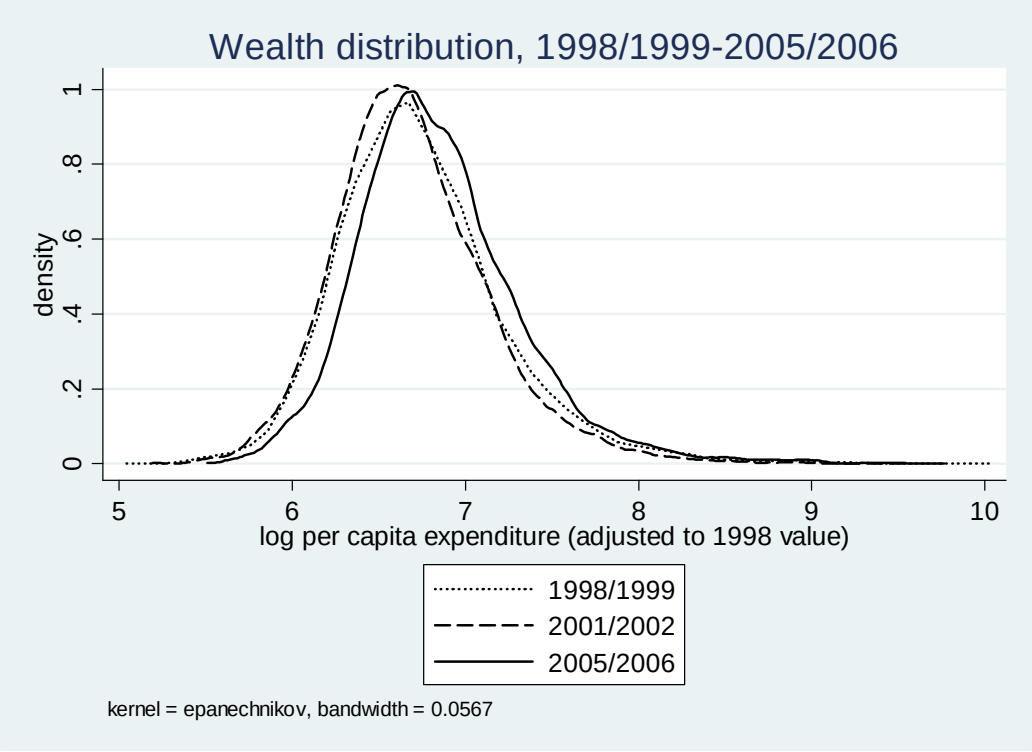
Still on the demand side, cash transfer programs and conditional cash transfer programs in other countries have show to be effective in reducing child work (Skoufias and Parker 2001; Bourguignon, Ferreira et al. 2003; de Janvry, Finan et al. 2004; Attanasio, Fitzsimons et al. 2006; Edmonds and Schady 2008). Yet, the demand side intervention alone might not be very effective. The two competing activities against child schooling are child work and child inactiveness. Sufficient cash transfers may provide enough incentives for children to switch from work to school. But it might not be effective for children who are currently inactive, in which case the lack of income is not the main reason for the child not enrolling in school. This is especially the case for rural girls in Pakistan where cultural reasons are profound. Presence of girl schools in sufficient close distance and presence of qualified women teachers are crucial to motivate parents to send girls to schools.

Thus, on the supply side, the creation of a proper and effective educational system has an equally important reaching impact as direct attempts on the demand side on the fight for increasing school enrollment and again child labor and child inactiveness (Alderman, Orazem et

al. 2001; Lloyd, Mete et al. 2005). Evidence shows that children do not attend school because of the low quality of education offered (The World Bank Group 2008). It should be noted that the quality referred here is actually very basic elements for education, such as presence of qualified teachers and provision of basic teaching instruments, for example, blackboard and chalk. Interventions focusing on improving school infrastructures and increasing incentives for teachers to show up should further reduce child labor and inactiveness and increase school enrollment.

Wealth is crucial but not sufficient. Deliberate coordination of both demand side interventions at the household level and supply side interventions at the community and national level are essential to further increase the school enrollment rate in Pakistan and to achieve the Millennium Development Goals (MDGs) in education as earliest as possible. Along the path of the efforts, monitoring and evaluations will provide evidences on the cost-effectiveness of different interventions and the insights of the targeting strategies.

Figure 1. Wealth Distribution, 1998/1999-2005/2006



Note: capita is adjusted with adult equivalence.

Figure 2. Child Activities by Age and sex

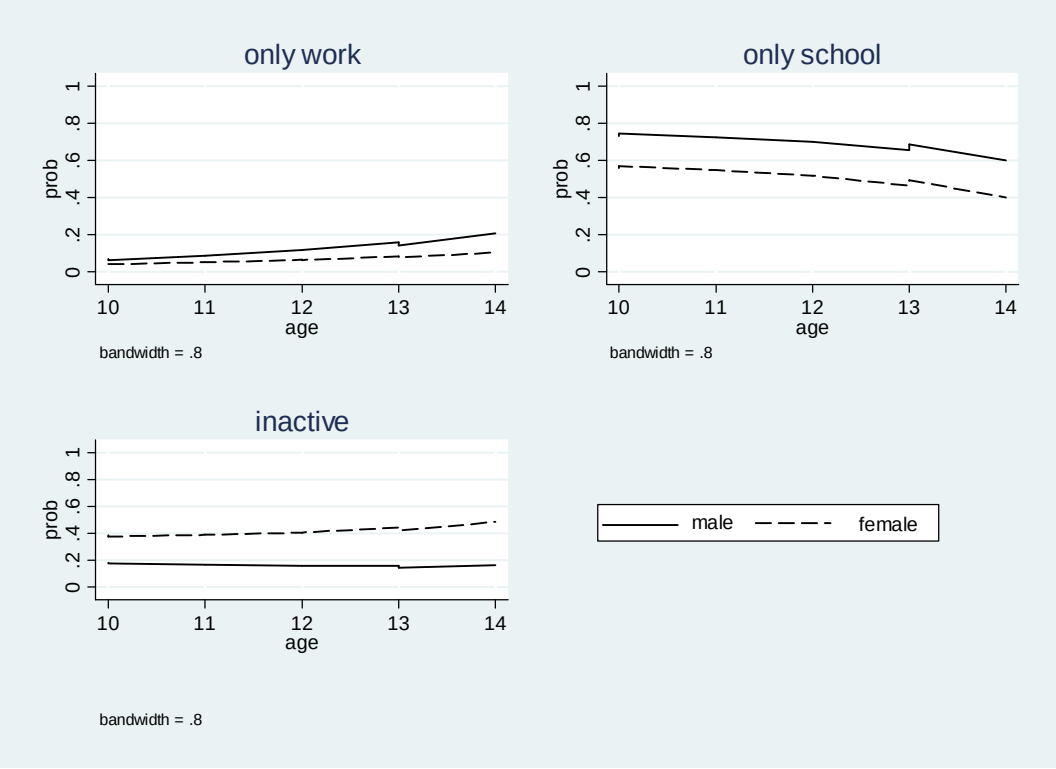
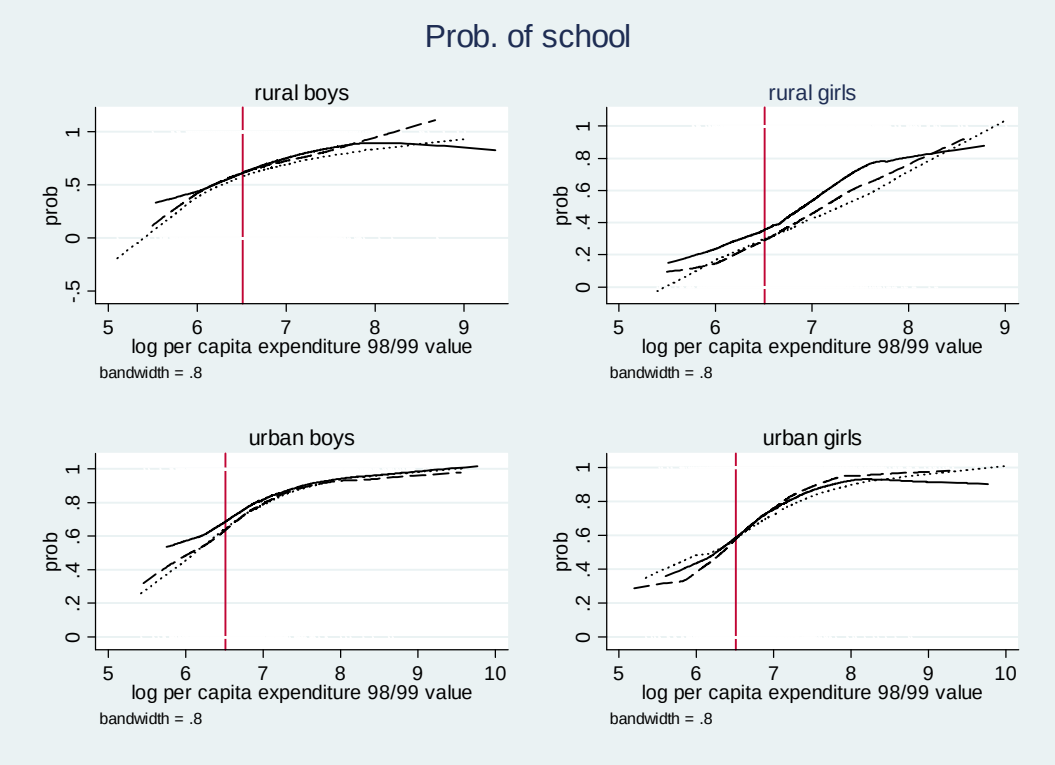
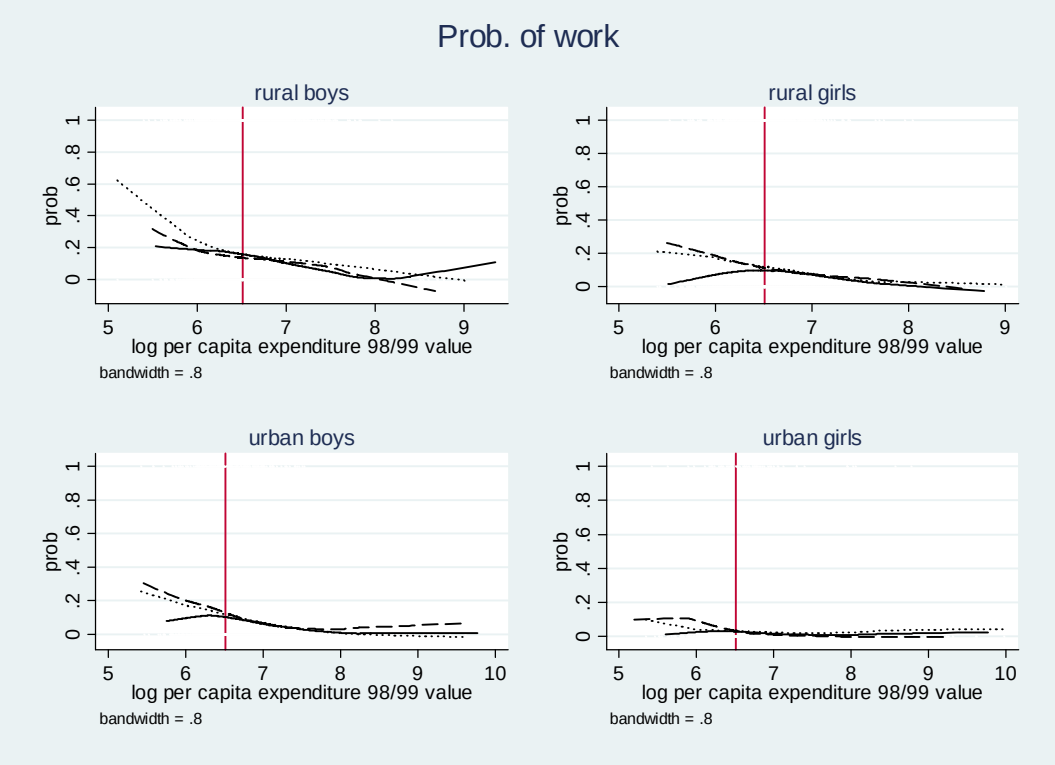


Figure 3A. Lowess nonparametric fit of likelihood of school and log per capita expenditure, by years



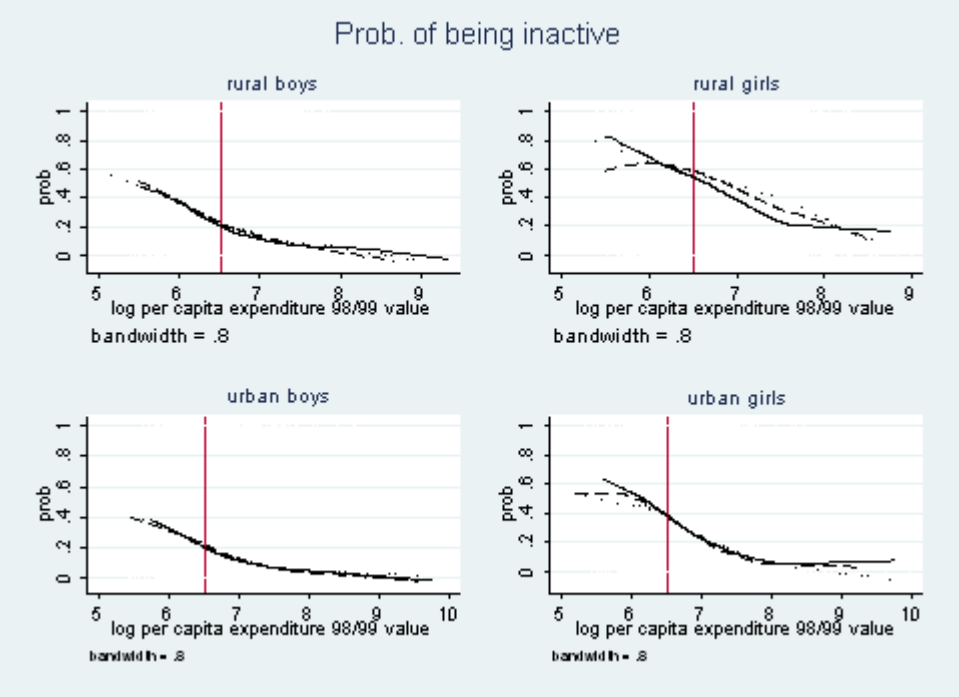
Note: capita is adjusted with adult equivalence.

Figure 3B. Lowess nonparametric fit of likelihood of school and log per capita expenditure, by years



Note: capita is adjusted with adult equivalence.

Figure 3C. Lowess nonparametric fit of likelihood of school and log per capita expenditure, by years between likelihood of school and log per capita expenditure, by years



….. 1998/99 ------- 2001/02 ____ 2005/06

Note: capita is adjusted with adult equivalence.

Table 1. Boys and Girls Activities by Urban and Rural Status (98-06)

	Boys			Girls		
	98/99	01/02	05/06	98/99	01/02	05/06
Urban						
both	0.01	0.01	0.01	0.01	0.01	0.00
School	0.72	0.69	0.78	0.70	0.69	0.75
employed	0.09	0.10	0.07	0.03	0.02	0.02
Inactive	0.16	0.18	0.13	0.25	0.27	0.23
Rural						
both	0.02	0.02	0.04	0.01	0.01	0.01
School	0.61	0.64	0.67	0.35	0.35	0.47
employed	0.15	0.14	0.13	0.12	0.13	0.10
Inactive	0.20	0.19	0.16	0.52	0.51	0.41

Table 2. The Employment Status of Boys and Girls by Urban and Rural, 1998-2006

	Boys			Girls		
	98/99	01/02	05/06	98/99	01/02	05/06
Urban						
Paid workers	0.69	0.63	0.78	0.56	0.54	0.39
Unpaid family workers	0.31	0.37	0.22	0.44	0.46	0.61
Rural						
Paid workers	0.31	0.32	0.33	0.28	0.25	0.32
Unpaid family workers	0.69	0.68	0.67	0.72	0.75	0.68

3. The Industry Groups Boys and Girls Worked in Urban and Rural Areas, 1998-2006

	Boys			Girls		
	98/99	01/02	05/06	98/99	01/02	05/06
Urban						
Agriculture	0.08	0.10	0.08	0.20	0.22	0.09
Manufacturing	0.31	0.31	0.22	0.36	0.59	0.39
Construction	0.04	0.01	0.07	0.03	0.00	0.00
Wholesale and Retail	0.33	0.27	0.37	0.04	0.02	0.04
Transportation	0.05	0.07	0.04	0.00	0.00	0.00
Services	0.17	0.22	0.22	0.38	0.17	0.48
Rural						
Agriculture	0.74	0.74	0.68	0.72	0.81	0.82
Manufacturing	0.07	0.05	0.06	0.18	0.12	0.11
Construction	0.05	0.05	0.07	0.00	0.01	0.01
Wholesale and Retail	0.06	0.06	0.11	0.01	0.00	0.00
Transportation	0.03	0.04	0.02	0.00	0.00	0.00
Services	0.05	0.06	0.05	0.09	0.06	0.06

Table 4a: Child Activities decisions for Rural Boys

	model 1		model 2	
	(1) Work	(2) Inactive	(3) Work	(4) Inactive
age*	0.12	-0.96	0.17	-0.97
	[0.39]	[0.33]**	[0.40]	[0.33]**
age squared*	0.01	0.04	0.01	0.04
	[0.02]	[0.01]**	[0.02]	[0.01]**
Log per capita expenditure*	-4.55	-5.08	-5.32	-4.76
	[1.53]**	[1.46]***	[1.53]***	[1.45]**
Logexp square*	0.28	0.28	0.32	0.26
	[0.11]*	[0.11]*	[0.11]**	[0.11]*
Own agricultural land, less 2 acre			0.82	0.71
			[0.09]	[0.07]***
Own agricultural land, greater than 2 acre			1.09	0.69
			[0.14]	[0.09]**
Own any farm animals			1.48	1.02
			[0.10]***	[0.07]
Own any laden animals			1.36	0.77
			[0.10]***	[0.05]***
Own any poultry			1.05	0.88
			[0.10]	[0.08]
Characteristics of head:				
Age	-0.01	-0.01	-0.01	-0.01
	[0.00]***	[0.00]***	[0.00]***	[0.00]**
Female	0.56	1.05	0.61	1.05
	[0.16]*	[0.23]	[0.17]	[0.23]
Married	0.95	1.05	0.97	1.05
	[0.12]	[0.11]	[0.12]	[0.11]
Female and Married	0.53	0.49	0.52	0.49
	[0.18]	[0.12]**	[0.17]*	[0.12]**
Head: Reside at home	0.99	0.71	0.94	0.72
	[0.29]	[0.16]	[0.28]	[0.16]
Educ.: primary school	0.42	0.58	0.44	0.57
	[0.03]***	[0.04]***	[0.03]***	[0.04]***
Educ. middle school	0.27	0.45	0.28	0.45
	[0.04]***	[0.05]***	[0.04]***	[0.05]***
Educ. High school	0.15	0.3	0.15	0.3
	[0.02]***	[0.03]***	[0.03]***	[0.03]***
Educ: college or above	0.06	0.16	0.06	0.17
	[0.02]***	[0.03]***	[0.02]***	[0.03]***
Employer	1.11	1.08	1.1	1.08
	[0.36]	[0.27]	[0.36]	[0.27]
own account workers	1.49	0.83	1.28	0.88
	[0.09]***	[0.04]***	[0.08]***	[0.05]*
unpaid family workers	1.16	0.61	1	0.65
	[0.37]	[0.19]	[0.33]	[0.20]
household size*	-0.18	-0.18	-0.2	-0.17
	[0.03]***	[0.03]***	[0.03]***	[0.03]***
# (age 0-5, female)*	0.14	0.11	0.15	0.1

	[0.05]**	[0.04]**	[0.05]**	[0.04]*
# (age 0-5, male)*	0.21	0.11	0.22	0.1
	[0.05]***	[0.04]**	[0.05]***	[0.04]*
# (age 5-15, female)*	0.13	0.1	0.14	0.09
	[0.04]**	[0.04]**	[0.04]**	[0.04]*
# (age 5-15, male)*	0.17	0.19	0.18	0.18
	[0.04]***	[0.04]***	[0.04]***	[0.04]***
# (age 15-55, male)*	0.14	0.31	0.15	0.3
	[0.05]**	[0.04]***	[0.05]**	[0.04]***
# (age, over 55, female)*	0.11	-0.08	0.1	-0.08
	[0.08]	[0.07]	[0.08]	[0.07]
# (age, over 55, male)*	0.28	0.33	0.27	0.32
	[0.09]**	[0.08]***	[0.09]**	[0.08]***
Sindh	1.59	1.67	1.87	1.56
	[0.12]***	[0.11]***	[0.15]***	[0.11]***
NWFP	0.63	0.75	0.69	0.76
	[0.06]***	[0.06]***	[0.07]***	[0.07]**
Balochistan	0.85	1.01	1.02	0.92
	[0.09]	[0.09]	[0.12]	[0.08]
school distance	1	1.45	1.05	1.45
	[0.22]	[0.29]	[0.23]	[0.29]
presence of girl school	0.48	0.55	0.49	0.54
	[0.04]***	[0.04]***	[0.04]***	[0.04]***
presence of boy school	0.24	0.29	0.25	0.29
	[0.06]***	[0.07]***	[0.06]***	[0.07]***
median wage for men*	-0.01	0	-0.01	0
	[0.00]***	[0.00]**	[0.00]***	[0.00]**
% household having piped water	0.92	0.73	0.95	0.71
	[0.12]	[0.07]**	[0.12]	[0.07]***
% households have pumped water	1.25	0.86	1.26	0.86
	[0.12]*	[0.07]	[0.12]*	[0.07]
time fixed effect, 01/02	0.73	0.8	0.66	0.81
	[0.05]***	[0.05]***	[0.05]***	[0.05]***
time fixed effect, 05/06	0.98	0.83	0.89	0.83
	[0.07]	[0.05]**	[0.07]	[0.05]**
Pseudo R-squared	0.15		0.15	
Model chi-square	3307.94		3456.91	
N	13546		13546	

Note: 1. * continuous variables, where coefficients are presented. Otherwise, relative risk ratio (RRR) is reported. 2. capita is adjusted with adult equivalence.

Table 4b: Child Activities decisions for Rural Girls

	model 1		model 2	
	(1) Work	(2) Inactive	(3) Work	(4) Inactive
age*	-0.93	-1.16	-0.94	-1.16
	[0.51]	[0.31]***	[0.51]	[0.31]***
age squared*	0.06	0.06	0.06	0.06
	[0.02]**	[0.01]***	[0.02]**	[0.01]***
Log per capita expenditure*	1.61	-1.7	0.84	-2.06
	[2.39]	[1.23]	[2.40]	[1.24]
logexp_square*	-0.21	0.07	-0.16	0.09
	[0.18]	[0.09]	[0.18]	[0.09]
Own agricultural land, less 2 acre			0.94	0.91
			[0.13]	[0.07]
Own agricultural land, greater than 2 acre			0.6	0.77
			[0.11]**	[0.08]*
Own any farm animals			1.81	1.48
			[0.17]***	[0.09]***
Own any laden animals			1.21	1.07
			[0.11]*	[0.06]
Own any poultry			1.07	0.91
			[0.13]	[0.07]
Characteristics of head:				
Age	-0.02	-0.01	-0.02	-0.01
	[0.00]***	[0.00]***	[0.00]***	[0.00]***
Female	0.78	0.53	0.84	0.55
	[0.25]	[0.10]**	[0.27]	[0.11]**
Married	0.8	0.94	0.8	0.94
	[0.13]	[0.09]	[0.13]	[0.09]
Female and Married	0.49	0.79	0.51	0.79
	[0.18]	[0.17]	[0.19]	[0.17]
Head: Reside at home	0.59	0.93	0.6	0.94
	[0.20]	[0.20]	[0.21]	[0.20]
Educ.: primary school	0.42	0.52	0.45	0.53
	[0.04]***	[0.03]***	[0.04]***	[0.03]***
Educ. middle school	0.25	0.39	0.27	0.4
	[0.04]***	[0.03]***	[0.04]***	[0.03]***
Educ. High school	0.12	0.21	0.13	0.21
	[0.02]***	[0.02]***	[0.02]***	[0.02]***
Educ: college or above	0.1	0.16	0.11	0.17
	[0.02]***	[0.02]***	[0.03]***	[0.02]***
employer	1.32	1.09	1.32	1.09
	[0.63]	[0.24]	[0.62]	[0.24]
own account workers	2.22	1.07	1.87	0.98
	[0.18]***	[0.05]	[0.16]***	[0.05]
unpaid family workers	3.47	1.38	2.7	1.23
	[1.22]***	[0.37]	[0.97]**	[0.33]
household size*	-0.17	-0.2	-0.19	-0.21
	[0.04]***	[0.02]***	[0.04]***	[0.02]***

# (age 0-5, female)*	0.29	0.28	0.31	0.29
	[0.06]***	[0.04]***	[0.06]***	[0.04]***
# (age 0-5, male)*	0.31	0.32	0.33	0.33
	[0.06]***	[0.04]***	[0.06]***	[0.04]***
# (age 5-15, female)*	0.15	0.15	0.17	0.16
	[0.05]**	[0.03]***	[0.05]**	[0.03]***
# (age 5-15, male)*	0.23	0.26	0.24	0.26
	[0.05]***	[0.03]***	[0.05]***	[0.03]***
# (age 15-55, male)*	0.16	0.28	0.18	0.29
	[0.06]**	[0.04]***	[0.06]**	[0.04]***
# (age, over 55, female)*	-0.1	-0.04	-0.11	-0.04
	[0.10]	[0.06]	[0.10]	[0.06]
# (age, over 55, male)*	0.3	0.38	0.29	0.37
	[0.11]**	[0.07]***	[0.12]*	[0.07]***
Sindh	3.12	3.1	3.69	3.33
	[0.29]***	[0.20]***	[0.36]***	[0.23]***
NWFP	0.68	2.76	0.69	2.87
	[0.09]**	[0.19]***	[0.10]*	[0.21]***
Balochistan	0.74	2.65	0.91	2.89
	[0.13]	[0.23]***	[0.16]	[0.26]***
school distance	0.36	0.34	0.41	0.37
	[0.11]**	[0.08]***	[0.13]**	[0.09]***
presence of girl school	0.02	0.02	0.02	0.02
	[0.00]***	[0.01]***	[0.00]***	[0.01]***
presence of boy school	0.48	0.96	0.49	0.97
	[0.16]*	[0.27]	[0.16]*	[0.27]
median wage for men*	-0.01	0	-0.01	0
	[0.00]***	[0.00]***	[0.00]***	[0.00]***
% household having piped water	0.45	0.71	0.49	0.74
	[0.09]***	[0.06]***	[0.10]***	[0.07]***
% households have pumped water	1.39	1.2	1.44	1.22
	[0.18]*	[0.10]*	[0.19]**	[0.10]*
time fixed effect, 01/02	0.76	0.85	0.69	0.82
	[0.07]**	[0.05]**	[0.06]***	[0.05]***
time fixed effect, 05/06	0.83	0.81	0.72	0.76
	[0.08]*	[0.04]***	[0.07]***	[0.04]***
N	12308		12308	

Note: 1. * continuous variables, where coefficients are presented. Otherwise, relative risk ratio (RRR) is reported. 2. capita is adjusted with adult equivalence.

Table 4c: Child Activities decisions for Urban Children

	urban boys (model 1)		urban girls (model 1)	
	(1) Work	(2) Inactive	(3) Work	(4) Inactive
age*	-0.56	-0.07	0.09	-0.91
	[0.67]	[0.47]	[1.15]	[0.40]*
age squared*	0.04	0.01	0.02	0.05
	[0.03]	[0.02]	[0.05]	[0.02]**
Log per capita expenditure*	-4.02	-5.39	-8.62	-2.29
	[2.17]	[1.37]***	[1.83]***	[1.19]
logexp_square*	0.19	0.29	0.55	0.08
	[0.16]	[0.10]**	[0.13]***	[0.09]
Characteristics of head:				
Age	-0.01	0.01	-0.01	0
	[0.01]	[0.00]	[0.01]	[0.00]
Female	0.73	0.8	0.83	0.48
	[0.21]	[0.19]	[0.37]	[0.11]**
Married	0.62	0.72	0.69	0.9
	[0.11]*	[0.11]*	[0.21]	[0.11]
Female and Married	0.69	0.7	0.37	0.86
	[0.27]	[0.23]	[0.25]	[0.25]
Head: Reside at home	1.48	0.74	1.97	0.83
	[0.71]	[0.21]	[2.02]	[0.20]
Educ.: primary school	0.56	0.62	0.31	0.51
	[0.07]***	[0.06]***	[0.07]***	[0.04]***
Educ. middle school	0.41	0.48	0.2	0.41
	[0.06]***	[0.06]***	[0.06]***	[0.04]***
Educ. High school	0.23	0.32	0.1	0.27
	[0.04]***	[0.04]***	[0.04]***	[0.03]***
Educ: college or above	0.09	0.26	0.16	0.22
	[0.03]***	[0.04]***	[0.06]***	[0.03]***
employer	0.79	1.37	0.94	1.24
	[0.34]	[0.33]	[0.59]	[0.25]
own account workers	1.11	0.93	0.78	1
	[0.11]	[0.07]	[0.14]	[0.06]
unpaid family workers	0	0.63	0	0.48
	[0.00]	[0.52]	[0.00]	[0.30]
household size*	-0.22	-0.19	-0.13	-0.2
	[0.05]***	[0.03]***	[0.08]	[0.03]***
# (age 0-5, female)*	0.22	0.17	-0.07	0.27
	[0.08]**	[0.06]**	[0.14]	[0.05]***
# (age 0-5, male)*	0.17	0.07	0.4	0.32
	[0.08]*	[0.06]	[0.12]**	[0.05]***
# (age 5-15, female)*	0.18	0.08	0.14	0.17
	[0.06]**	[0.05]	[0.11]	[0.04]***
# (age 5-15, male)*	0.24	0.28	0.21	0.22
	[0.06]***	[0.05]***	[0.11]	[0.04]***
# (age 15-55, male)*	0.17	0.25	-0.02	0.26

	[0.07]*	[0.05]***	[0.13]	[0.04]***
# (age, over 55, female)*	-0.44	-0.2	0.15	0.15
	[0.14]**	[0.10]*	[0.21]	[0.08]
# (age, over 55, male)*	0.45	0.35	0.28	0.31
	[0.15]**	[0.11]**	[0.26]	[0.09]***
Sindh	0.69	1.24	1.58	2.07
	[0.08]**	[0.11]*	[0.30]*	[0.16]***
NWFP	0.63	0.42	0.47	2.53
	[0.08]***	[0.05]***	[0.15]*	[0.22]***
Balochistan	0.37	0.68	0.82	2.5
	[0.07]***	[0.08]**	[0.27]	[0.25]***
school distance	1.46	1.42	1.15	1.14
	[0.79]	[0.62]	[1.13]	[0.44]
presence of girl school	0.29	0.45	0.08	0.04
	[0.06]***	[0.08]***	[0.05]***	[0.01]***
presence of boy school	0.11	0.13	0.84	0.65
	[0.06]***	[0.06]***	[0.64]	[0.20]
median wage for men*	0	0	0	0
	[0.00]	[0.00]	[0.00]	[0.00]
% household having piped water	1.56	1.09	0.45	0.8
	[0.46]	[0.21]	[0.20]	[0.13]
% households have pumped water	1.81	0.96	1.38	1.3
	[0.56]	[0.20]	[0.65]	[0.23]
time fixed effect, 01/02	0.93	0.91	0.71	0.91
	[0.10]	[0.08]	[0.14]	[0.07]
time fixed effect, 05/06	0.87	0.91	0.71	0.9
	[0.10]	[0.08]	[0.14]	[0.06]
N	8038		7852	

Note: 1. * continuous variables, where coefficients are presented. Otherwise, relative risk ratio (RRR) is reported. 2. capita is adjusted with adult equivalence.

Appendix1. Utility Functional Forms

Following Edmond (2007), the standard of current living V_0 is produced by a linear homogenous function which depends on current purchase input C, input of child time in household and initial household asset (A_0). The current purchase input is a function of non-child income (Y), income or saved expenditure if households have to hire another labor to do the same work that child is engaged, and education expenditure incurred if the child goes to school. That is,

$$V_0=V_0 (C, H, A_0) = V_0((Y+wW- eE), H, A_0)$$

where w is the child wage for the paid work or in the case that child works as unpaid family member, it is the opportunity cost if the household hires other labor rather than the child; e the education expenditure and E is education/schooling. The standard of future living in time1 is V1, which is a function of child education, that is $V_1=V_1(E)$.

At the current time, the parent's problem is:

$$\text{Max } U(V_0, V_1) = \text{Max } U (V_0(Y+wW-eE, H, A_0), V_1(E)),$$

$$\text{subject to } E+H+W=1, E \geq 0, H \geq 0, W\geq 0.$$

A child can combine different activities, such as go to school and work, or go to school and perform the domestic activities. However, there lacks data on quantity of time spent on various activities. Available data also shows that a very small percentage of children go to school and work at the same time. Therefore, I further restrict E=(0,1), H=(0,1) and W=(0,1). These three activities will guide the rest of theoretical model and empirical analysis in the next sections.

Parent makes the final decisions depending on the marginal utility of each activity:

$$MU_W = \frac{\partial U}{\partial V_0}\frac{\partial V_0}{\partial C} w$$

$$MU_E = \frac{\partial U}{\partial V_1}\frac{\partial V_1}{\partial E} - \frac{\partial U}{\partial V_0}\frac{\partial V_0}{\partial C} e$$

$$MU_H = \frac{\partial U}{\partial V_0}\frac{\partial V_0}{\partial H}$$

The marginal utility of work is from child contribution to production of current living standard through wage income. The marginal utility of education is from returns on education in the future and lack the current marginal utility from current production of living standard through educational expenditures. The marginal utility of being "inactive" depends on child contribution of production of current living standard through domestic work.

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